

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1 and 2 (canceled)

3. (currently amended): A method ~~In a wireless communication system, a method~~ of performing channel estimation, the method comprising:

(a) receiving a time domain signal r ;
(b) multiplying, element-to-element, the sequences \underline{m} and \underline{r} by a chirp waveform, the chirp waveform being based on the length of ~~the FFT~~ a fast Fourier transform (FFT) and denoting the resulting sequences as \underline{m}_w and \underline{r}_w respectively, where \underline{m} is a midamble sequence; and

(c) creating a chirp sequence \underline{v} based on the chirp waveform.

4. (original): The method of claim 3 wherein the chirp waveform is $W^{n/2}$ for $n=0,1,2,\dots,P-1$ where $P = 456$ for burst types 1/3 or $P = 192$ for burst type 2, and $W = e^{-j\frac{2\pi}{P}}$

5. (original): The method of claim 4 wherein the chirp sequence $\underline{v} = W^{-(n-P+1)^2/2}$ for $n = 0,1,2,\dots,2P-2$.

Claims 6 and 7 (canceled)

8. (currently amended): A ~~wireless communication system~~ receiver for performing channel estimation, the receiver configured to system comprising:

receive (a) means for receiving a time domain signal r ; ~~(b) means for and multiply multiplying~~, element-to-element, the sequences m and r by a chirp waveform, the chirp waveform being based on the length of the ~~FFT~~ a fast Fourier transform (FFT) and denoting the resulting sequences as m_w and r_w respectively, where m is a midamble sequence; and

create (e) means for creating a chirp sequence v based on the chirp waveform.

9. (currently amended): The receiver system of claim 8 wherein the chirp waveform is $W^{j\lambda}$ for $n=0,1,2,\dots,P-1$ where $P = 456$ for burst types 1/3 or $P = 192$ for burst type 2, and $W = e^{-j\frac{2\pi}{P}}$.

10. (currently amended): The receiver system of claim 9 wherein the chirp sequence $v = W^{-j(n-P+1)^2\lambda}$ for $n=0,1,2,\dots,2P-2$.

Claims 11 and 12 (canceled)

13. (currently amended): A wireless transmit/receive unit (WTRU) for performing channel estimation, the WTRU configured to comprising:

~~receive (a) means for receiving~~ a time domain signal r ; ~~(b) means for and multiply multiplying,~~ element-to-element, the sequences m and r by a chirp waveform, the chirp waveform being based on the length of the ~~FFT a fast Fourier transform (FFT)~~ and ~~denote denoting~~ the resulting sequences as m_w and r_w respectively, where m is a midamble sequence; and

~~create (c) means for creating~~ a chirp sequence v based on the chirp waveform.

14. (original): The WTRU of claim 13 wherein the chirp waveform is $W^{n/4}$ for $n=0,1,2,\dots,P-1$ where $P = 456$ for burst types 1/3 or $P = 192$ for burst type 2, and $W = e^{-j\frac{2\pi}{P}}$.

15. (original): The WTRU of claim 14 wherein the chirp sequence $v = W^{-(n-P+1)/4}$ for $n=0,1,2,\dots,2P-2$.

Claims 16 and 17 (canceled)

18. (currently amended): A base station (BS) for performing channel estimation, the BS ~~configured to comprising:~~

~~receive (a) means for receiving~~ a time domain signal r ; ~~(b) means for and multiply multiplying,~~ element-to-element, the sequences m and r by a chirp waveform, the chirp waveform being based on the length of the ~~FFT a fast Fourier transform (FFT)~~ and ~~denote denoting~~ the resulting sequences as m_w and r_w respectively, where m is a midamble sequence; and

~~create (c) means for creating~~ a chirp sequence v based on the chirp waveform.

19. (original): The BS of claim 18 wherein the chirp waveform is $W^{n/2}$ for $n = 0, 1, 2, \dots, P-1$ where $P = 456$ for burst types 1/3 or $P = 192$ for burst type 2, and $W = e^{-j\frac{2\pi}{P}}$.

20. (original): The BS of claim 19 wherein the chirp sequence $\underline{v} = W^{-(n-P+1)^2/2}$ for $n = 0, 1, 2, \dots, 2P-2$.

21. (currently amended): ~~A method in a wireless communication system, a method~~ for performing channel estimation, the method comprising:

(a) receiving a time domain signal \underline{r} ;

(b) expressing $\underline{r} = \underline{m} \otimes \underline{h}$ in the frequency domain, resulting in an output signal $\underline{R} = \underline{M} \cdot \underline{H}$, where \underline{m} is a midamble sequence, \underline{h} is a channel impulse response, \otimes is a circular convolution operator, \underline{R} is the fast Fourier transform (FFT) of time domain signal \underline{r} , \underline{M} is the FFT of midamble sequence \underline{m} , and \underline{H} is the FFT of channel impulse response \underline{h} , and $\underline{R} = F(\underline{r})$, $\underline{M} = F(\underline{m})$ and $\underline{H} = F(\underline{h})$ where $F(\cdot)$ is defined as the operator of forward or inverse FFT;

(c) calculating \underline{H} is calculated by dividing \underline{R} by \underline{M} , where $\underline{R}/\underline{M}$ is the element-to-element division of the corresponding two FFT sequences; and

(d) estimating the impulse response by inverse FFT of \underline{H} by calculating $\underline{h} = F^{-1}(\underline{H})$ where $F^{-1}(\cdot)$ is defined as the operator of forward or inverse FFT and $\underline{h} = F^{-1}(F(\underline{r})/F(\underline{m}))$ and $F(\underline{r})/F(\underline{m})$ denotes the element-to-element division of FFT sequences $F(\underline{r})$ and $F(\underline{m})$.

22. (original): The method of claim 21 wherein the forward or inverse

FFT are exchangeable in the following form: $F^{-1}(\underline{x}) = \frac{1}{P}(F(\underline{x}'))^*$, wherein P is the length of FFT.

Claims 23 and 24 (canceled)

25. (original): The method of claim 21 wherein the FFT is extended to a proper length L to process a plurality of different burst types by using a chirp transform algorithm (CTA) to compute $F(\underline{r})$ and $F(\underline{m})$.

Claims 26-30 (canceled)

31. (new): A receiver configured to perform the method of claim 21.

32. (new): A wireless transmit/receive unit (WTRU) configured to perform the method of claim 21.

33. (new): A base station configured to perform the method of claim 21.